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WaterLine

A publication about Ontario's water and wastewater industry.

Water and Energy: Inextricably Linked

Water and energy. They're two of the largest, most challenging issues facing our planet today. Traditionally, however, governments and industries around the world have tended to view these massive issues in isolation. The global community is only beginning to recognize the critical linkages between the two.

Industry professionals have dubbed this complex interdependency the 'water-energy nexus'. Essentially, this term refers to the fact that water is critical to energy generation, while energy is critical to providing access to water. There's a limited supply of each. And increased demand for one necessarily means increased demand for the other. As the world's population continues to grow, this relationship between water and energy is being increasingly strained.

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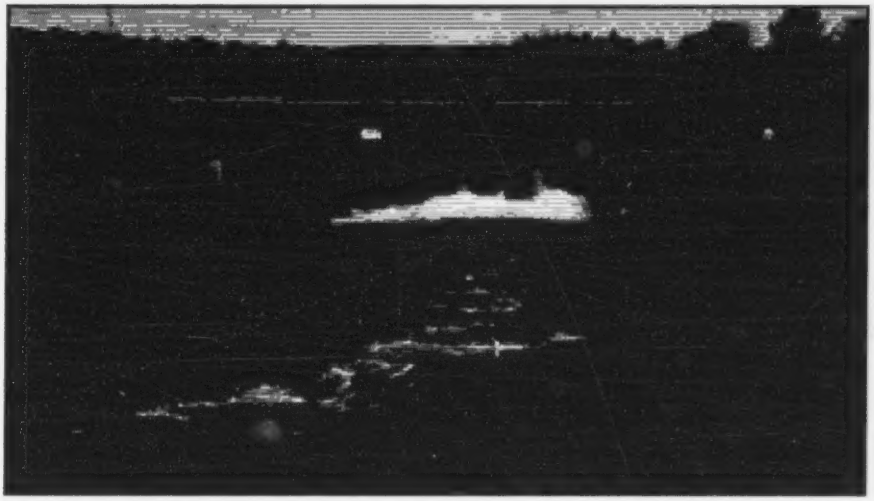
The relationship between water and energy is also an issue of growing importance to many of Ontario's municipalities. "One of the things we're seeing loud and clear is that providing water and wastewater services are the largest account on municipal electricity bills," says Carol Maas, Director of Innovation and Technology with the POLIS Project on Ecological Governance.[1]



Many municipalities and utilities around the world are turning to renewable energy and new technologies in their search to identify ways to decrease water consumption and energy usage. The Regional Municipality of Peel is a leader in this area, having unveiled its ambitious Water Efficiency Plan in 2004. According to the Region's plan, it would cost about $112 million for new infrastructure to provide the equivalent supply of water and wastewater treatment as will be made available by implementing the Water Efficiency Plan, which will only cost about $33 million. This is just one example of the type of forward thinking that will help reduce water and energy usage over the long-term.

The long-term challenges emerging from the water-energy nexus are unsettling at best. "Water and energy are both finite resources. And climate change has the potential to reduce the availability of water, which can in turn reduce our capacity to generate electricity," says Maas.

Some of these challenges can be addressed through increased mechanical efficiencies and water/energy conservation programs. But at the end of the day, new policies will be required from the government in order to encourage adoption of such conservation initiatives by industry and the public in order to protect these precious resources for generations to come.

[1] The recently released report, *Greenhouse Gas and Energy Co-benefits of Water Conservation* is available at www.poliswaterproject.org/nexus/

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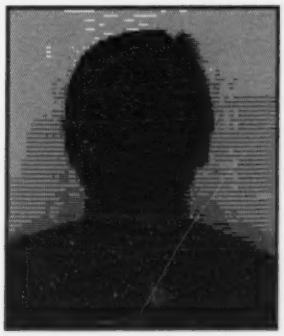


A message from Nick Reid
OCWA's VP Business Development

The Water-Energy Nexus — Maybe Coffee Drinkers are the Answer

A recent poll published in The National Post said that 83% of people who had drunk coffee the previous day made it at home – an increase of 5 per cent from just a year ago. The implication was that people had changed their behaviour to save money during the recession.

If it takes a global financial crisis to get people to brew their own coffee, how do you suppose we can get the public, government and industry to ramp up their conservation efforts in the areas of water and energy?

This issue of Waterline looks at the complicated intertwined relationship between water and energy. Our society uses massive amounts of energy to treat, pump and distribute water. At the same time, it uses massive amounts of water to create energy. That's expensive and many say that in light of growing populations and global warming, it's unsustainable.

Experts agree that conservation is the key – but conservation is a matter of changing behaviours, to revisit our coffee drinker analogy once again. If we can reduce water demand, we'll also be reducing the demand for energy and vice versa. Reducing the carbon footprint of water and wastewater treatment facilities and increasing mechanical efficiencies are both possible solutions. But conservation at the household level can also make a major difference if enough people take action. Canada could learn a few lessons from the Danes, for example, who use eight times less water than we do.[1]

You'll read about an 'automated pumping schedule' system that's being implemented in a growing number of water facilities around the world to help conserve energy. And we also provide you with details of the 'Energy Matters Summit' held in Mississauga in late April, which serves as a forum for important discussion and debate about public sector energy management in Ontario.

If we can reduce water demand, we'll also be reducing the demand for energy and vice versa. Increasing mechanical efficiencies in water and wastewater treatment facilities are one solution.

[1] Energy-water nexus: Energy Use in the Municipal, Industrial, and Agricultural Water Sectors, 2007, page 5.

Orangeville Goes 'Turbo' with New Blower

The Town of Orangeville is looking forward to cost savings in wastewater treatment thanks to the installation of their new Turbo Blower.

The Turbo Blower, from APG-Neuros Inc., uses a forced-air turbine impeller to aerate wastewater sludge. The Town recently worked with engineers from OCWA to install and test the new system on a trial basis.

The blower's efficient design and operation is expected to draw 30-40% less power than a traditional Positive Displacement (PD) blower system. The blower also features an innovative 'airfoil bearing', which eliminates the use of lubricants and belts, greatly reducing maintenance costs and downtime.

"We're evaluating how to optimize the system's use in conjunction with existing blowers. If all goes as planned we're looking at potential energy savings in the tens of thousands of dollars," explains OCWA Sales Representative David O'Connell. "The system would pay for itself within five years."

The new blower also produces far less noise and vibration than PD systems – as little as 80 decibels. "We can stand a coin on its edge on the blower and it won't fall," says Richard Laliberte, Operations Manager at OCWA's West Highlands Hub.

The Turbo Blower has a much smaller footprint than PD systems, no special foundation requirements, and because the air drawn through the impeller passes through channels around the motor housing, no external cooling is required. Richard says the system was easy to install and has proven just as easy to use.

Having passed initial trials, the Turbo Blower was permanently installed in February. "We're looking forward to seeing how it works over the long haul," says Richard. "It's a good example of how new technology is changing water and wastewater management."

Peel Region to host Energy Matters Summit

On April 20-21, the Region of Peel hosted its fifth annual Energy Matters Summit in Mississauga.

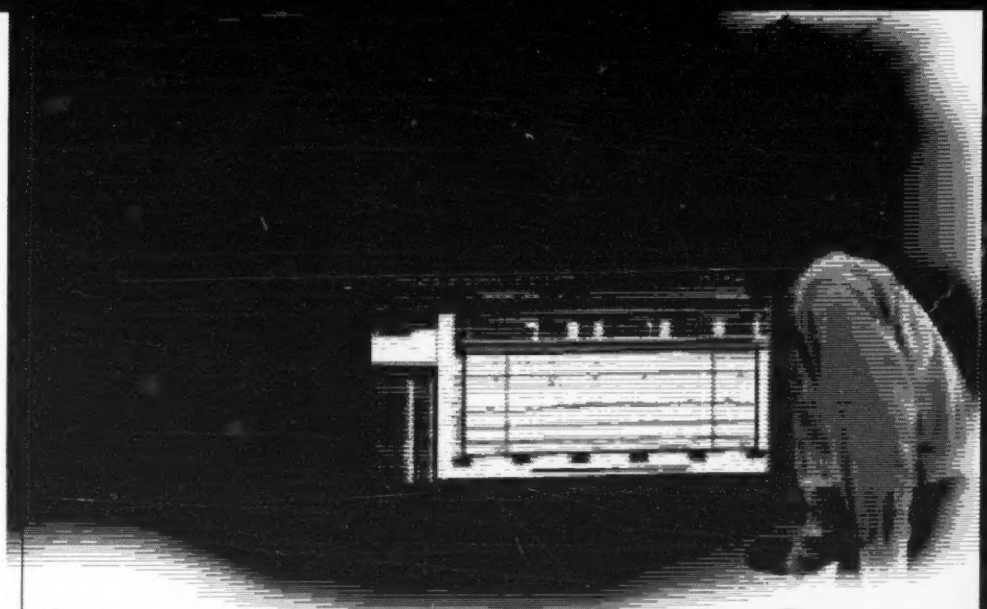
As Ontario's leading public sector energy management and climate change conference, Energy Matters brings together hundreds of representatives from municipal and provincial governments, universities and colleges, school boards and hospitals to discuss strategies to manage energy costs and control consumption.

Steve Hall, Director of Real Property Asset Management for the Region of Peel, says water management was a major topic of discussion at this year's summit.

"The costs of water treatment and pumping represent about 70% of the Region of Peel's overall energy expenditure," says Hall. "Obviously that's got to be a primary focus for us, as it is for other municipalities. Optimization of pumping schedules, improving efficiencies, performing energy audits, adopting new technology – these are all areas we have to explore. The Summit was a great opportunity to learn from the best in the world."

The financial benefits to energy conservation are obvious, but Hall says there's a larger consideration – the environment.

"Municipalities are big consumers of power, both electricity and natural gas," says Hall. "We all need to be more aware of our carbon footprint, our contribution to greenhouse gases, and our impact on finite resources. Reducing energy consumption affects all of those things. Every kilowatt really does count."



Automated Pumping Schedule Can Mean Big Energy Savings for Municipalities

Electricity. It's the single highest cost at any water treatment facility. Those massive pumps demand huge amounts of electricity to move all that water from point A to point B.

Sophisticated new technology, however, promises to put a dent in those high energy bills. Several communities across Canada are currently evaluating the merits of incorporating 'automated pumping schedules' in their facilities.

"With this type of system, a computerized pump scheduler turns the facility's pumps on and off according to a wide range of variables, such as pump capacity, current weather conditions, predicted water demand and the precise hydro costs at any given time of day," according to John Glass, OCWA's Transmission Operations Manager at the South Peel facilities in Mississauga. "The system would be able to analyze all of this complex information and then run the facility's pumps in the most efficient manner possible."

One of the reasons the concept is growing in popularity among Ontario municipalities is the scheduled switch to a spot market for electricity. "These communities are currently on a capped system for hydro costs and don't have the ability to reduce their bills by shifting their usage to different times of day," says Glass. "Once the rate caps are removed, a community that employs an automated pumping schedule system would be able to link their system directly into the real-time electricity pricing data from Ontario Power Generation and adapt their operations to concentrate the majority of the water conveyance in the off peak (lower cost) time of day."

" ... a computerized pump scheduler turns the facility's pumps on and off according to a wide range of variables ... "

There are approximately 50 municipalities around the world utilizing automated pump scheduling, in jurisdictions such as New Zealand, California and Washington D.C. to name a few. "This is certainly the next major trend in the area of water movement and the idea is gaining momentum here in Canada as well," says Glass.

Kirkland Lake sewage plant remains operational despite roof collapse

A season of record snowfall took its toll in Kirkland Lake on February 27, causing the roof of the town's water pollution control plant to collapse. Although five OCWA employees were working inside the facility at the time, no one was hurt in the mishap.

"The good news story here is that a number of groups, including the Town, several government ministries and OCWA, have successfully worked together under very trying conditions to keep the facility operational throughout this situation," says Tony Janssen, OCWA's Operations Manager for Northeastern Ontario.

The collapse initially knocked out the plant's blowers and broke several pipelines, threatening to interrupt the facility's operations. OCWA quickly dispatched one of its five Emergency Response Teams (OERTs) to address the situation. "Coincidentally, our OERT for Northeastern Ontario is located in Kirkland Lake, so they were on the scene and so was the equipment" Janssen says.

Together with the Town of Kirkland Lake, OCWA crews had the blowers and pipelines repaired within 48 hours. "The plant can operate for 48 to 72 hours without the blowers operating," says Janssen. "The facility uses a bacteriological process and without the blowers to provide oxygen, the bacteria used in the process will die. That's why it was imperative that we eventually had them up and running again quickly."

The facility has been a hub of activity since the night of the roof collapse. In addition to the work by the Town and OCWA, the Ministry of the Environment, the Ministry of Labour and a team of engineers have also been actively involved. In late March, a controlled demolition of the remainder of the facility took place (above), with painstaking efforts to maintain the plant's operations throughout the process.

OCWA down under

Fact-finding visit sheds light on benefits of computerized, automated pumping system

Our story on page 3 examined the energy-friendly benefits associated with automated pumping systems in the water industry. Earlier this spring, OCWA sent one of its energy experts to Wellington, New Zealand to observe such a system in action.

"We had a number of objectives for our visit," says John Glass, OCWA Transmission Manager at the South Peel facilities and one of the Agency's experts in the area of energy. "We wanted the opportunity to study the hardwired logic of how the system operates in order to define what it can and cannot do and to better understand the operational transition required to implement such a system. Equally important, we wanted the opportunity to tour the facilities in New Zealand and speak with their operations people about the system to bring that knowledge back to Ontario."

Wellington (the capital of New Zealand) is just one of a number of municipalities around the world using a computerized, automated pumping system in its water facility. These systems can translate into a range of benefits, including significant energy-related cost savings. Some experts suggest implementing such a system can help cut a facility's annual electricity bill by 8% to 12%.

OCWA WINS 2009 Operations Challenge

The 2009 WEAO Operations Challenge was held on April 5, 6, 7 this year at the Westin Harbour Castle and the OCWA Jets, out of Stratford, took first place in both the safety and lab events, as well as first place overall.

The OCWA Jets (l to r): Dennis Rau, Al Robdrup, Bev Mollard (coach), Marcel Misuraca and Mike Paola

The Flangetastic Four (l to r): Doug Macham, Richard Junkin, Jen Britten (coach), Steven Priestly and Mark McConachie

Competing this year for the first time and credited with an honourable mention from the organizers were the Flangetastics Four, an OCWA team out of the Georgian Bay Hub.

The Operations Challenge is an annual event made up of five separate events: Process Control, Safety, Lab, Maintenance and Collection. The competition in Toronto is a lead-up to the North American Championships held at WEFTEC each fall.

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